

ABSTRACT

Many useful chemical conversion processes result in the production or removal of thermal energy as the result of such processes. A device for permitting staged addition of heat into a steam reforming, carbon dioxide reforming, water-gas-shift, or preferential reactor using an inline system built to accomplish multiple reactant injection and gas mixing along the flow path of a chemical reactor. This integrates a uniform reaction injection device, a gas mixing component, and a catalytic initiator within a section designed to be installed between compartments used to promote an endothermic process. The intent is to provide heat through an endothermic process that uniformly increases temperature for convection heat transport into the subsequent compartment.

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